Curriculum Vitae

Rasmus Matthias Birn

Section on Functional Imaging Methods
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RESEARCH INTERESTS:

The primary motivation of my research is to increase the accuracy and interpretability of measured functional MRI signals. My current research is focused on understanding the dynamics of the blood oxygenation level dependent (BOLD) fMRI signal, as well as characterizing the various sources of noise, such that we can make more accurate statements about the underlying neuronal function. I am currently applying the advances in these areas to improving functional connectivity analyses, and to the study of autistic spectrum disorders. My previous research has focused on the development of new imaging strategies and the application of post-processing techniques to reduce artifacts resulting from task-induced subject motion. Advancements in these areas are essential for the improved application of fMRI to clinical studies and basic neuroscience research.

EDUCATION:

B.A. in Physics, University of California at Santa Cruz, June 1994.
Thesis: *X-ray Holography*
Minor: Mathematics

Ph.D. in Biophysics, Biophysics Research Institute, Medical College of Wisconsin, October 1999.
Dissertation Title: *Functional Magnetic Resonance Imaging in the Presence of Task-Induced Motion.*

RESEARCH EXPERIENCE

- Staff Scientist — *Apr. 2004 – present.*
  Section on Functional Imaging Methods, Laboratory of Brain and Cognition, National Institute of Mental Health, NIH
- Intramural Research Training Award (IRTA) Post-doctoral Fellow — *Dec. 1999 – Apr. 2004.*
  Functional MRI Facility, Intramural Research Program, National Institute of Mental Health, NIH

TEACHING / ADVISING EXPERIENCE

- Teaching Assistant, *Introduction to Physics I*, University of California at Santa Cruz, 1994.
- Lab Assistant, Introductory Physics Labs, University of California at Santa Cruz, 1991-1994.
  Maintaining physics teaching and laboratory apparatus,
  Setting up lecture demonstrations and teaching labs.
- Tutor, *Students Practicing and Respecting Knowledge (SPARK) program*, 2005-2007.
  Tutoring middle school (5th-8th grade) students in science, math, history, reading
- Mentored the following individuals at NIH:
  August Tuan, *Graduate Student, Salk Institute, 2003*
  Jason Diamond, *Howard Hughes Fellow, 2005*
  Monica Smith, *Post-baccalaureate Research Fellow, 2004-2006*
  Tyler B. Jones, *Post-baccalaureate Research Fellow, 2006-2008*
  Tanya Gerner, *Summer Student, 2008.*

HONORS AND AWARDS

- Highest honors in major (Physics), University of California at Santa Cruz, 1994.
- College honors, University of California at Santa Cruz, 1994.
- Phi Beta Kappa, national honors society, 1994-present.
- Outstanding research poster presentation, 6th Annual Graduate Research Poster Sessions, Medical College of Wisconsin, 1997.
- Student Travel Stipend, International Society of Magnetic Resonance in Medicine, 1997, 1998, 1999.
- Outstanding Teacher Award, International Society for Magnetic Resonance in Medicine, 2008.

MEMBERSHIP IN PROFESSIONAL SOCIETIES

- International Society of Magnetic Resonance in Medicine, 1994-present.
- Organization for Human Brain Mapping, 2001-present.
- Society for Neuroscience, 2004, 2007
- American Association of Physicists in Medicince 2006-present.
- Editorial Board Member, NeuroImage, Sept 2006 – present.
- Reviewer for *NeuroImage, Human Brain Mapping, Magnetic Resonance in Medicine, Medical Physics, Journal for Magnetic Resonance Imaging, Neurobiology of Aging, MAGMA, PNAS*, and *Neuron*.

SKILLS

- Computer Skills
  UNIX/Linux, MS Windows, MS Access database programming, Mathcad, C programming, AFNI (fMRI data analysis package)
- Fluent in English and German

PUBLICATIONS

Papers:

1. F.Z. Yetkin, V. Haughton, R.W. Cox, J.S. Hyde, R.M. Birn, R. Prost, *The Effect of Motion Outside the FOV on FMRI*, AJNR 17, 1005-1009, 1996.

2. P.A. Bandettini, A. Jesmanowicz, J. Van Kylen, R.M. Birn, J.S. Hyde, *Functional MRI of Scanner Acoustic Noise Induced Brain Activation*, Magnetic Resonance in Medicine, 39 (3), 410-416, 1998.

3. R.M. Birn, P.A. Bandettini, R.W. Cox, A. Jesmanowicz, R. Shaker, *Magnetic Field Changes in the Human Brain Due to Swallowing or Speaking*, Magnetic Resonance in Medicine, 40,55-60, 1998.

4. M.K. Kern, R.M. Birn, S. Jaradeh, A. Jesmanowicz, R.W. Cox, J.S. Hyde, R. Shaker, *Identification and Characterization of Cerebral Cortical Reponse to Esophageal Mucosal Acid Exposure*, Gastroenterology, 115, 1353-1362, 1998.

5. R.M. Birn, P.A. Bandettini, R.W. Cox, R. Shaker, *Event-Related FMRI of Tasks Involving Brief Motion*, Human Brain Mapping 7(2), 106-114, 1999.

6. M. Marquart, R.M. Birn, V. Haughton, *Single- and multiple-event paradigms for identification of motor cortex activation*, American Journal of Neuroradiology, 21(1), 94-8, 2000.

7. M.K. Kern, R.M. Birn, S. Jaradeh, A. Jesmanowicz, R.W. Cox, J.S. Hyde, R. Shaker, *Swallow-related cerebral cortical activity maps are not specific to deglutition*, Am J Physiol Gastrointest Liver Physiol, 280(4), G531-538, 2001.

8. A.K Gosain, R.M. Birn, J.S. Hyde, *Localization of the Cortical Response to Smiling Using New Imaging Paradigms with Functional Magnetic Resonance Imaging*, Plastic and Reconstructive Surgery, 108, 1136-1144, 2001.

9. R.M. Birn, Z.S. Saad, P.A. Bandettini, *Spatial Heterogeneity of the Nonlinear Dynamics in the FMRI BOLD Response*, NeuroImage 14, 817-826, 2001.

10. R.M. Birn, R.W. Cox, P.A. Bandettini, *Detection Versus Estimation in Event-Related fMRI: Choosing the Optimal Stimulus Timing*, NeuroImage, 15, 252-264, 2002.

11. P.A. Bandettini, R.M. Birn, D. Kelley, Z.S. Saad, *Dynamic nonlinearities in BOLD contrast: neuronal or hemodynamic?*, International Congress Series, 1235, 73-85, 2002.

12. R.M. Birn, R.W. Cox, P.A. Bandettini, *Functional MRI Experimental Designs and Processing Strategies for Studying Brain Activation Associated with Overt Responses*, NeuroImage, 23, 1046-1058, 2004.

13. R.M. Birn, P.A. Bandettini, *The effect of stimulus duty cycle and "off" duration on BOLD response linearity*, NeuroImage, 27, 70-82, 2005.

14. S. Kemeny, F.Q. Ye, R. Birn, A.R. Braun, *Comparison of continuous overt speech fMRI using BOLD and arterial spin labeling*, Human Brain Mapping, 24(3), 173-183, 2005.

15. R.M. Birn, J.B. Diamond, M.A. Smith, P.A. Bandettini, *Separating respiratory variation-related fluctuations from neuronal activity-related fluctuations in fMRI*, NeuroImage 31, 1536-1548, 2006.

16. R.M. Birn, *The Behavioral Significance of Spontaneous Fluctuations in Brain Activity*, Neuron 56, 8-9, 2007.

17. R.M. Birn, M.A. Smith, T.B. Jones, P.A. Bandettini, *The Respiration Response Function: The temporal dynamics of fMRI signal fluctuations related to changes in respiration*, NeuroImage 40(2), 644-654, 2008.

18. R.M. Birn, K. Murphy, P.A. Bandettini, *The effect of respiration variations on independent component analysis results of resting state functional connectivity*, Human Brain Mapping, 29(7), 740-750, 2008.

19. A.S. Tuan, R.M. Birn, P.A. Bandettini, and G.M. Boynton, *Differential transient MEG and fMRI responses to visual stimulation onset rate*, International Journal of Imaging Systems and Technology,18(1), 17-28, 2008.

20. T.B. Jones, P.A. Bandettini, R.M. Birn, *Integration of motion correction and physiological noise regression in fMRI*, NeuroImage (In Press), 2008.

21. R.M. Birn, L. Kenworthy, L. Case, R. Caravella, T.B. Jones, P.A. Bandettini, A. Martin, *Neural systems supporting lexical search guided by letter and semantic category cues: A self-paced overt response fMRI study of verbal fluency*, NeuroImage (submitted; under review).

22. T.B. Jones, P.A. Bandettini, L. Kenworthy, L.K. Case, S.C. Milleville, A. Martin, R.M. Birn, *Possible Sources of Functional Connectivity and Under-Connectivity in Adolescents with Autism Spectrum Disorder*, NeuroImage (submitted; under review).

Book Chapters:

1. R.M. Birn, P.A. Bandettini, K. Donahue, *Magnetic Resonance Imaging: Principles, Pulse Sequences, and Functional Imaging*, Biomedical Uses of Radiation, (W. Hendee, Ed.), Vol.1, Chapter 9. VCH-John Wiley and Sons, New York, 1999.

2. P.A. Bandettini, R.M. Birn, K.M. Donahue, *Functional MRI: Background, Methodology, Limits, and Implementation*, Handbook of Psychophysiology, 2nd ed. (J. T. Cacioppo, L. G. Tassinary, G. G. Berntson, Eds.), Chapter 36, p. 978-1014. Cambridge University Press, New York, 2000.

Abstracts Presented at National and International Meetings:

1. R.M. Birn, R. Shaker, A. Jesmanowicz, R.W. Cox, J.S. Hyde. *Magnetic Field Artifacts due to Swallowing in Functional Magnetic Resonance Imaging*, Gastroenterology, 112(4), A700 (1996).

2. R.M. Birn, F.Z. Yetkin, J.S. Hyde. *Artifacts in FMRI caused by Motion Outside the FOV*. In "Proceedings of ISMRM Second Annual Meeting, New York, 1996" p. 1770.

3. P.A. Bandettini, A. Jesmanowicz, J. Van Kylen, R.M. Birn, J.S. Hyde, *fMRI of Scanner Noise Induced Auditory Cortex Activation*, in "Proceedings of ISMRM Fifth Scientific Meeting, Vancouver, B.C., 1997," p. 349.

4. P.A. Bandettini, A. Jesmanowicz, R.M. Birn, J. Van Kylen, J.S. Hyde, *Combined Gradient-Echo and Asymmetric Spin-Echo (GREASE): Functional MRI Comparisons and Uses*, in "Proceedings of ISMRM Fifth Scientific Meeting, Vancouver, B.C., 1997," p. 1639.

5. R.M. Birn, A. Jesmanowicz, R.W. Cox, R. Shaker, *Correction of Dynamic B_z-field Artifacts in EPI*, in "Proceedings of ISMRM Fifth Scientific Meeting, Vancouver, B.C., 1997," p. 1913.

6. R.M. Birn, P.A. Bandettini, A. Jesmanowicz, R. Shaker, R.W. Cox, *Bz-field changes in the Human Brain due to Speaking and Swallowing*, in "Proceedings of ISMRM Fifth Scientific Meeting, Vancouver, B.C., 1997," p. 458.

7. R.M. Birn, A.K. Gosain, J.S. Hyde, *fMRI of Facial Muscle Movement Using a Single-Trial Paradigm*, in "Proceedings of ISMRM Sixth Scientific Meeting, Sydney, Australia, 1998," p. 1474.

8. R.M. Birn, R.W. Cox, *Improved Image Registration of Echo-Planar Images by Including Magnetic Field Correction*, in "Proceedings of ISMRM Sixth Scientific Meeting, Sydney, Australia, 1998," p. 716.

9. R.M. Birn, P.A. Bandettini, R.W. Cox, R. Shaker, *FMRI During Stimulus Correlated Motion and Overt Subject Responses Using a Single Trial Paradigm*, in "Proceedings of ISMRM Sixth Scientific Meeting, Sydney, Australia, 1998," p. 159.

10. R.M. Birn, P.A. Bandettini, J. Van Kylen, R.W. Cox, *Motion Decoupled FMRI: Event-Related Mapping During Overt Responses*, Human Brain Mapping, Montreal, 1998.

11. R.M. Birn, A.K. Gosain, J.S. Hyde, *Cortical Activity During Facial Muscle Movement Demonstrated by Functional MRI*, Plastic Surgery Research Council, 1998.

12. R.M. Birn, P.A. Bandettini, R.W. Cox, R. Shaker, *Improved Technique for Study of Brain Activity During Swallowing by Functional Magnetic Resonance Imaging (FMRI)*, "American Gastroenterology Association: Digestive Disease Week, 1998, Nr.3872.

13. R.M. Birn, B.D. Ward, R.W. Cox, *Functional MRI of Frequent Overt Word Production Using Random Inter-Stimulus Intervals*, ISMRM 7th Annual Meeting, Philadelphia, 1999, #784.

14. R.M. Birn, B.D. Ward, R.W. Cox, *FMRI During Overt Speech of Frequent Single Trials*, Human Brain Mapping, Duesseldorf, 1999.

15. R.M. Birn, Z.S. Saad, P.A. Bandettini, *Spatial Distribution of the Nonlinearity of the BOLD Response*, Human Brain Mapping, San Antonio, 2000.

16. R.M. Birn, J. Bodurka, P.A. Bandettini, *The efficacy of cardiac gating with variable TR correction in fMRI*, ISMRM 9th Scientific Meeting, Glasgow, 2001.

17. R.M. Birn, Z.S. Saad, P.A. Bandettini, *Linearity of the BOLD response to varying durations of stimulus "OFF" periods*, ISMRM 9th Scientific Meeting, Glasgow, 2001.

18. R.M. Birn, P.A. Bandettini, *Estimated BOLD impulse response depends on stimulus ON/OFF ratio*, Human Brain Mapping, Brighton, 2001.

19. R.M. Birn, H. Heekeren, S. Marrett, J. Bodurka, P.A. Bandettini, *Estimating Transient Neuronal Activity Dynamics using BOLD Contrast*, ISMRM 10th Scientific Meeting, Honolulu, 2002.

20. R.M. Birn, P.A. Bandettini, *The Effect of T2' Changes on Spin-Echo EPI-derived Brain Activation Maps*, ISMRM 10th Scientific Meeting, Honolulu, 2002.

21. R.M. Birn, J. Bodurka, P.A. Bandettini, *Estimating temporal characteristics of neuronal activity in the visual cortex from BOLD-fMRI*, Human Brain Mapping, Sendai, 2002.

22. R.M. Birn, Z.S. Saad, P.A. Bandettini, *Optimum Stimulus Timing for Estimating fMRI Response Latencies*, ISMRM 11th Scientific Meeting, Toronto, 2003.

23. K.E. Bove Bettis, J.A. Bodurka, R.M. Birn, P. Rowser, Z.S. Saad, R.W. Cox, P.A. Bandettini, *Appearance of Calcification Artifact in the Falx Cerebri on Phase Maps Using a High Resolution Venogram Technique at 3 Tesla*, ISMRM 11th Scientific Meeting, Toronto, 2003.

24. K.E. Bove Bettis, J.A. Bodurka, R.M. Birn, P. Rowser, Z.S. Saad, R.W. Cox, P.A. Bandettini, *Demonstration of Cerebral Venous Vasculature Using a High Resolution Venogram Technique at 3 Tesla*, ISMRM 11th Scientific Meeting, Toronto, 2003.

25. R.M. Birn, P.A. Bandettini, *Voxel-wise determination of relative intra- and extra-vascular contributions to the fMRI BOLD signal*, Human Brain Mapping, New York, 2003.

26. W.M. Luh, R.M. Birn, P.A. Bandettini, *Proton-Density Increase Measured by Gradient-Echo and Spin-Echo TE-Stepping EPI During Functional Motor Activation*, Human Brain Mapping, New York, 2003.

27. A.S. Tuan, R.M. Birn, G.M. Boynton, P.A. Bandettini, *Non-linear Response in Ramped Onset Stimuli in V1*, Human Brain Mapping, New York, 2003.

28. R.M. Birn, K.E. Bove-Bettis, P.A. Bandettini, *A voxel-wise comparison of global BOLD changes during breath-hold with CBV maps derived from bolus-injected Gd-DTPA*, ISMRM 12th Scientific Meeting, Kyoto, Japan, 2004.

29. R.M. Birn, K.E. Bove-Bettis, P.A. Bandettini, *Vessel Size Mapping in Human Brain using a Bolus Injection of Gd-DTPA and Combined GE and SE EPI*, ISMRM 12th Scientific Meeting, Kyoto, Japan, 2004.

30. R.M. Birn, K.E. Bove-Bettis, P.A. Bandettini, *Bolus Gd-DTPA washout dynamics predict BOLD dynamics*, ISMRM 12th Scientific Meeting, Kyoto, Japan, 2004.

31. R.M. Birn, J.A. Bodurka, N. Petridou, P.A. Bandettini, *Experimental determination of the effect of T2' changes in spin-echo EPI*, ISMRM 12th Scientific Meeting, Kyoto, Japan, 2004.

32. R.M. Birn, K.E. Bove-Bettis, P.A. Bandettini, *Calibrating BOLD fMRI Response Latencies Using Gd-DTPA Bolus Washout Dynamics*, Organization of Human Brain Mapping Meeting, Budapest, Hungary, 2004.

33. R.M. Birn, M.S. Smith, P.A. Bandettini, *Mapping and Correcting the Effects of Respiratory Variations in fMRI*, Organization of Human Brain Mapping , Toronto, Canada, 2005.

34. J. Diamond, R.M. Birn, P.A. Bandettini, *Low frequency respiration fluctuations co-localize with 'default-mode' network*, Organization of Human Brain Mapping , Toronto, Canada, 2005.

35. R.M. Birn, K. Murphy, J. Bodurka, P.A. Bandettini, *The use of multiple physiologic parameter regression increases gray matter temporal signal to noise by up to 50%*, ISMRM 14th Scientific Meeting, Seattle, 2006.

36. M.A. Smith, P.A. Bandettini, R.M. Birn, *Determining the latency between spontaneous respiration fluctuations and BOLD signal changes*, ISMRM 14th Scientific Meeting, Seattle, 2006.

37. K. Murphy, R.M. Birn, P.A. Bandettini, *The frequency profile of TE-dependent BOLD physiological fluctuation*, ISMRM 14th Scientific Meeting, Seattle, 2006.

38. R.M. Birn, K. Murphy, J. Bodurka, P.A. Bandettini, *Improvements of Temporal SNR in fMRI with multiple physiologic parameter regression*, Organization of Human Brain Mapping , Florence, Italy, 2006.

39. R.M. Birn, R. Caravella, L. Kenworthy, A. Martin, *Differential activation of frontal and temporal cortex by phonemic and category fluency: A self-paced overt response fMRI study*, Organization of Human Brain Mapping , Florence, Italy, 2006.

40. R.M. Birn, T.B. Jones, M.A. Smith, P.A. Bandettini, *Calibration of BOLD fMRI signal changes using cued and spontaneous breathing variations*, ISMRM 15th Scientific Meeting, Berlin, Germany, 2007.

41. T.B. Jones, P.A. Bandettini, R.M. Birn, *Assessment and Correction of Subject Motion in Physiological Noise Regression*, ISMRM 15th Scientific Meeting, Berlin, Germany, 2007.

42. R.M. Birn, T.B. Jones, M.A. Smith, P.A. Bandettini, *The Respiration Response Function: modeling the temporal dynamics of respiration-volume induced changes in the brain*, ISMRM 15th Scientific Meeting, Berlin, Germany, 2007.

43. R.M. Birn, T.B. Jones, M.A. Smith, P.A. Bandettini, *Calibration of BOLD fMRI signal changes using cued and spontaneous breathing variations*, Organization of Human Brain Mapping, Chicago, 2007.

44. T.B. Jones, P.A. Bandettini, R.M. Birn, *Assessment of and Correction for Motion Effects on Physiological Noise Regression*, Organization of Human Brain Mapping, Chicago, 2007.

45. R.M. Birn, T.B. Jones, M.A. Smith, P.A. Bandettini, *The Respiration Response Function: modeling the temporal dynamics of respiration-volume induced changes in the brain*, Organization of Human Brain Mapping, Chicago, 2007.

46. W.A. Postman-Caucheteux., S. Hoffman, D. Picchioni., J. McArdle, R. Birn, & A. Braun, *Distinct activation patterns for accurate vs. inaccurate naming of actions and objects: An fMRI study with stroke patients with chronic aphasia*. Brain & Language (Special Issue, Academy of Aphasia 2007) 103:150-151, 2007.

47. R.M. Birn, L.Kenworthy, L.K. Case, T.B. Jones, S.C. Milleville, A. Martin, *Functional Neuroimaging of Overt Verbal Fluency in Adolescents with Autism Spectrum Disorders*, Society for Neuroscience, San Diego, 2007.

48. R. M. Birn, K. Murphy, and P. A. Bandettini, *The effect of respiration variations on independent component analysis of resting state functional connectivity*, ISMRM 16th Scientific Meeting, Toronto, Canada, 2008.

49. T.B. Jones, L. Kenworthy, L.K. Case, S.C. Milleville, P.A. Bandettini, A. Martin, R.M. Birn, *Possible sources of functional connectivity and under-connectivity in adolescents with autism spectrum disorders*, ISMRM 16th Scientific Meeting, Toronto, Canada, 2008.

50. R. M. Birn, K. Murphy, and P. A. Bandettini, *The effect of respiration variations on independent component analysis of resting state functional connectivity*, Organization of Human Brain Mapping, Melbourne, Australia, 2008.

51. T.B. Jones, L. Kenworthy, L.K. Case, S.C. Milleville, P.A. Bandettini, A. Martin, R.M. Birn, *Possible sources of functional connectivity and under-connectivity in adolescents with autism spectrum disorders*, Organization of Human Brain Mapping, Melbourne, Australia, 2008.

52. K. Murphy, R.M. Birn, P.A. Bandettini, *The Impact of Global Signal Regression on Anti-Correlated Networks in Resting State Connectivity Analyses*, Organization of Human Brain Mapping, Melbourne, Australia, 2008.

Other Invited Presentations:

1. Dyphagia Institute Research Seminar. *Basic Principles of Magnetic Resonance Imaging.* Dysphagia Institute, Medical College of Wisconsin, Milwaukee, Wisconsin.
   July, 1995.
2. Marquette Biomedical Engineering Student Research Presentations. *Correction of dynamic Bz-field artifacts in echo-planar MRI*. Marquette University, Milwaukee, Wisconsin.
   April, 1997.
3. Gastroenterology Research Presentation. *Improved technique for the study of brain activity during swallowing by fMRI.* Medical College of Wisconsin, Milwaukee, Wisconsin.
   February, 1999.
4. Human Brain Mapping Educational Program. *Dealing with Motion and Susceptibility in fMRI.* San Antonio, Texas.
   June 2000.
5. Human Brain Mapping Educational Program. *FMRI Methods - Event Related vs. Blocked Design.*, Brighton, UK.
   June 2001.
6. Functional MRI: an introductory course. *The Basics of fMRI* Medical College of Wisconsin, Milwaukee, Wisconsin.
   October 2001.
7. Functional MRI: an introductory course. *Event-Related fMRI*. Medical College of Wisconsin, Milwaukee, Wisconsin.
   Oct. & May: 2000-present.
8. Berlin NeuroImaging Center, Charité Hospital. *Optimal paradigm design for fMRI*, Berlin, Germany
   April 2003.
9. University of Heidelberg, *New applications in high-field fMRI*, Heidelberg, Germany.
   July 2003.
10. MIND Institute, *Improving fMRI: vascular calibration and parallel imaging*, Albuquerque, New Mexico.
    January 2004.
11. Aarhus Universitet, *Improving BOLD fMRI by comparison to bolus contrast agent dynamics*, Aarhus, Denmark.
    July 2004.
12. International Brain Mapping & Intraoperative Surgical Planning Symposium, *Functional MRI: Challenges for Clinical Applications*, Keck School of Medicine, USC, Los Angeles, CA.
    November 2004.

13. Functional MRI: Advanced Course in Experimental Design and Image Analysis. *Principles of fMRI Experimental Design; Analysis of a Block Design Experiment; Analysis of an Event-Related Design Experiment.*. Medical College of Wisconsin, Milwaukee, Wisconsin.
    Nov: 2005-present.
14. University of Wisconsin, Madison, *The impact of low-frequency respiration fluctuations on fMRI data* Madison, Wisconsin.
    February 2006
15. Society for Magnetic Resonance Technologists (SMRT) , *Recent Advances in Functional MRI*, Seattle, Washington.
    May 2006.
16. SUNY Syracuse , *Recent Advances in Functional MRI*, Syracuse, New York.
    August 2006.
17. The Krasnow Institute, George Mason University , *Current Advances in Functional MRI*, Washington D.C.
    November 2006.
18. Cardiff University Brain Research and Imaging Centre (CUBRIC), *Respiration and fMRI: Artifacts and Benefits*, Cardiff, Wales, UK.
    May 2007.
19. University of Kentucky, *Respiration and fMRI: Artifacts or Benefit?*, Lexington, KY.
    April 2008.
20. International Society for Magnetic Resonance in Medicine Educational Session, *Fluctuations – Good and Bad*, Toronto, Canada.
    May 2008.
21. Organization for Human Brain Mapping Educational Session, *fMRI Physics and Physiology*, Melbourne, Australia.
    June 2008.
22. Organization for Human Brain Mapping, Workshop on 'It Takes a Community: Promoting Community Involvement at the Cutting Edge of fMRI Research', *A Community for Studying Resting State Networks*, Melbourne, Australia.
    June 2008.
23. Organization for Human Brain Mapping, Chair of workshop on 'Resting State Networks: Fact or Artefact?'. Presentation: *The Default Mode Network and the Effects of Respiration Variations*, Melbourne, Australia.
    June 2008.